

RELATIONSHIP AND TAXONOMY OF THE GENUS BRANDISIA

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THE GENUS *Brandisia* is confined to the warmer parts of continental eastern Asia from eastern India, Burma, and Indo-China to southwestern and southern China. It has been included in the Scrophulariaceae, usually in the tribe Cheloneae, together with other anomalous genera like *Paulownia* and *Wightia*. Its taxonomic position has been doubted ever since it was first described, but no extensive and intensive studies have ever been made on the genus.

The following study, based on the Chinese species of the genus, is made on materials assembled from various herbaria in America. To the curators of these herbaria I am indebted for their kindness in furnishing material for the study. This study was made at the Academy of Natural Sciences of Philadelphia during the tenure of a Harrison Fellowship for Research of the University of Pennsylvania. To Mr. Charles M. B. Cadwalader, President of the Academy, I wish to express my thanks for permitting me access to the splendid library and herbarium facilities. To Dr. Francis W. Pennell, Curator of Plants, my thanks are due for his suggestions and his kindness in reading the manuscript.

Abbreviations for the various herbaria cited are as follows:

- AA Arnold Arboretum of Harvard University
- ANSP Academy of Natural Sciences of Philadelphia
- B Bonati Herbarium, to be deposited at the herbarium of the University of California at Los Angeles
- MBG Missouri Botanical Garden
- NYBG New York Botanical Garden
- RBGE Royal Botanic Gardens, Edinburgh
- UC University of California
- USNH United States National Herbarium

RELATIONSHIP

The tribe Cheloneae of the Scrophulariaceae is very artificial and heterogenous. To this tribe have been referred several of the woody genera of various localities, while the family Scrophulariaceae as a whole is herbaceous. The anomalous positions of *Paulownia* and *Wightia* have been questioned by some authors. Hallier (in Bull. Herb. Boiss. II. 3: 181–207. 1903), in making a review of the taxonomic relationships of the various genera of the Scrophulariaceae, concluded that these two genera should be assigned to the Bignoniaceae. Campbell (in Bull. Torrey Bot. Club 57: 47–50. 1930) reached the same conclusion for *Paulownia*. He

indicated that the small amount of endosperm present in the seed is not sufficient reason to exclude it from the Bignoniaceae, with which it agrees in many other characters. Hallier, however, still considered *Brandisia* as belonging to the Cheloneae and evidently had not made any special study of the genus.

When Hooker and Thomson first described the genus no fruiting material was available. They noted the general appearance of the plant to be very different from the Scrophulariaceae, and rather verbenaceous. However, they placed it in the Scrophulariaceae because of the many-ovuled capsule. They remarked: "The order can, in fact, only be approximately determined, as the dehiscence of the fruit and the structure of the seed are unknown. If the seeds be exalbuminous, it will go to Bignoniaceae; but the ovary and placentation are so much like Scrophulariaceae, that in all probability albumen will be found in the seeds."

With regard to its position in the Scrophulariaceae, they said: "The position of *Brandisia* among Scrophularineae, as Mr. Bentham has kindly pointed out, is probably among Cheloneae, the only tribe in which large woody climbing plants occur. The flowers though solitary, have two opposite bracteoles on the pedicel, and the curiously elongate ovules probably become winged seeds like those of *Wightia*." In the *Genera Plantarum*, the fruits and seeds were described and the genus was placed in the tribe Cheloneae together with *Wightia* and *Paulownia*. This has been followed subsequently by other authors.

In 1873, Kurz (in *Jour. As. Soc. Beng.* 42(2): 39-141, 1874), in listing *Brandisia discolor* for the Burmese flora, considered the status of the genus and made the following statement: "Wightia, Wall., arcte affinis. Etiam *Buddleiae* generi affinis, sed differt corolla irregulari, etc. et certissime inter Sesameas recipienda est. Gardneria, a cl. Benthamio Loganiaceis adnumerata, Solanea esse videtur." He placed the genus under "Pedalineae." In 1877 Kurz (*For. Fl. Brit. Burma*) listed *Gelsemium* and *Buddleia* under "Pedalineae," in addition to *Brandisia*. Both these genera belong to the Loganiaceae.

Hance (in *Jour. Bot.* 18: 299, 1880) mentioned that *Brandisia* "has a curious resemblance to the genus *Eremophila*, in Myoporaceae." This is an Australian genus. The Myoporaceae is a small family, with the genus *Myoporum* extending from the tropics of the Old World to India and eastern Asia.

Thus we have suggested relationship for the genus *Brandisia* to the following families: Loganiaceae, Solanaceae, Scrophulariaceae, Bignoniaceae, Pedaliaceae, Myoporaceae, and Verbenaceae.

Being strongly zygomorphic in its corolla, *Brandisia* cannot be associated with either Loganiaceae or Solanaceae, in which the corolla is actinomorphic. The place of the genus is evidently with the other families which have distinct zygomorphy. In spite of the general resemblance of the plant in appearance to some genera of the Myoporaceae and the Verbenaceae, its many-ovuled ovaries and capsular fruits will not permit it to be included

in either of these two. Being a shrubby genus and without staminodes, it is not referable to the Pedaliaceae.

The families Scrophulariaceae, Bignoniaceae, Gesneriaceae, and Orobanchaceae are closely related and it is sometimes difficult to draw sharp distinctions between them. The Gesneriaceae and Orobanchaceae are predominantly herbaceous families, with unilocular ovaries, the latter being also parasitic. The choice for placing *Brandisia* is therefore left to the Scrophulariaceae and the Bignoniaceae.

The Bignoniaceae are nearly all woody plants, many of them climbers. The Scrophulariaceae are predominantly herbaceous. The chief distinction between the two families is the presence of endosperm in the seeds in the Scrophulariaceae and the absence of the same in the Bignoniaceae. The fruit of the Scrophulariaceae is usually a capsule or sometimes a berry. The seeds are usually numerous and small. In the Bignoniaceae, the fruit is most often a two-valved capsule, usually very long and silique-like. The seeds are numerous, large, flattened, and membranaceous-winged.

In the Scrophulariaceae, the tribe Cheloneae is one of the few that contains woody genera. In this tribe, which is artificial and ill-defined, there have been included some anomalous genera including *Paulownia*, *Wightia*, and *Brandisia*. *Paulownia* has been included in this family instead of the Bignoniaceae because of the presence of endosperm in the seeds. Hallier (l. c.) has shown that endosperm is only scantily present in *Paulownia* and is absent in *Wightia*, and that the seeds of both are winged. He concluded that both genera, in which all species are trees, should be transferred to the Bignoniaceae.

The ovoid loculicidal capsular fruit of *Brandisia* is very similar to those of the Scrophulariaceae, but the seeds, although very small, are winged and are without endosperm. They are small, numerous, linear, with an elongated membranaceous winged testa which is reticulated. The fruit of *Wightia* is an oblong or ovoid capsule, but is septicidal, and the seeds are membranaceous and broadly winged all around. The fruit of *Paulownia* is a woody capsule, loculicidally dehiscent, with numerous small winged seeds.

There is an apparent relationship between the three genera mentioned. The transference of *Paulownia* and *Wightia* to the Bignoniaceae, although they still appear somewhat anomalous in that family, seems to be a better arrangement than to have retained them in the Scrophulariaceae. *Brandisia*, although seeming even more isolated if placed in the Bignoniaceae, certainly should be associated with *Wightia*, whatever the latter's disposition. Here we have a situation in which there must be additional knowledge in anatomy, pollen structure, cytology, etc., before a satisfactory disposition can be made of these genera as to their taxonomic position, as well as delimitation of the various families concerned.

DISTRIBUTION

To the eight species recognized in this study, there should be added

three more from Annam, described by Bonati, of which no material is available. The genus ranges from Assam (India) and southern Burma to western China, north to western Hupeh, and southern China, east to Kwangtung. It is also found in Annam, Indo-China. So far it has not been recorded from Formosa, Hainan, or Tonkin.

The species are found mostly on mountains up to an altitude of 3000 meters, those in the south ascending usually to higher levels than those in the north. Most of the species are local in distribution and rare in occurrence. The most common and most widely distributed species is *Brandisia Hancei*, which is found in Yunnan, Szechuan, Hupeh, Kweichow, and Kwangsi. *Brandisia rosea* is found in northwestern Yunnan, Assam, and Bhutan. *Brandisia discolor* is found in southern Burma and southern Yunnan. *Brandisia Swinglei* occurs in Kwangtung and eastern Kwangsi, while *B. kwangsiensis* is known only from Kwangsi; the two species *B. laetevirens* and *B. glabrescens* are confined to southern Yunnan. *Brandisia racemosa* is found in Yunnan from the south to the northeast. Three species, *B. Chevalieri*, *B. annamitica*, and *B. scandens*, are known from Annam only.

The genus is primarily of the subtropical regions of eastern continental Asia, particularly of the mountains at medium levels. The center of distribution is apparently in Yunnan, where six of the eleven species occur. Only two, *B. Hancei* and *B. rosea*, occur in the Sino-Himalayan region in northwestern Yunnan, and these are not endemic. More species, although mostly of rather limited distribution, are found in the warmer regions of the province in the south as well as in the east.

TAXONOMY

Brandisia Hooker f. & Thomson in Jour. Linn. Soc. Bot. 8: 11. 1865.

Shrubs, erect, scandent, or straggling, sometimes parasitic, often with stellate tomentum; leaves opposite or rarely subopposite, oblong-lanceolate to ovate, entire to slightly serrate, usually densely tomentose especially below, short-petiolate; flowers axillary, solitary or rarely in pairs, sometimes several together or short- or long-racemose, pedicellate, the pedicels bibracteolate; calyx campanulate, with or without distinct veins, subequally 5-dentate or sometimes 4-7-dentate, rarely bilobed; corolla infundibular, bilabiate, usually densely tomentose, the tube usually incurved, the lips spreading, the upper lip larger and longer, concave, 2-lobed, the lobes broad, obtuse, the lower lip shorter, 3-lobed, the lobes smaller, subequal or unequal, acute, attached at the same level or in the middle and much lower; stamens 4, didynamous, ascending, subexserted or included, attached near the base of the corolla-tube; staminodes absent; filaments glabrous; anthers rounded, bilocular, the cells confluent above, long-pilose especially at the tip and the margins; ovary ovoid, hairy, bilocular, many-ovuled; styles elongate, filiform, glabrous, the stigma simple, entire; ovules numerous, linear-oblong; fruits capsular, chartaceous, ovoid, acute, loculicidally dehiscent into 2 valves; seeds small, numerous, linear, with thin winged membranaceous elongated testa, reticulated.

TYPE SPECIES: *B. discolor* Hook. f. & Thoms.

About 11 species, in the subtropical and warmer parts of continental eastern Asia.

With the addition of many other species to the original, it is necessary to redefine the generic concept of the genus and to form three subgenera, of which the last two contain each but a single species. In addition to the eight species recognized for China, India, and Burma, there are three species described by Bonati from Annam, of which no material is available to me. Two of these, *B. Chevalieri* Bonati and *B. scandens* Bonati, evidently belong to *Eubrandisia*. *Brandisia annamitica* Bonati, described as having the flowers in groups of 3-5 and having two staminodes, may require the erection of another subgeneric group.

SUBGENERA OF BRANDISIA

SUBGENUS I. *Eubrandisia*, subgen. nov.

Frutex erectus vel scandens; foliis oppositis, basi acutis vel cordatis; floribus axillaribus, solitariis vel binis; corolla flava vel rosea, labio antico brevior, lobis subaequalibus; calyce campanulato, plerumque 5-dentato.

SUBGENUS II. *Rhodobrandisia*, subgen. nov.

Frutex erectus; foliis oppositis vel suboppositis, basi longe attenuatis; floribus axillaribus, solitariis vel binis; corolla rosea vel raro flava, labio antico fere brevior, lobis subaequalibus; calyce bilobato, lobis integris vel leviter bifidis.

SUBGENUS III. *Coccineobotrys*, subgen. nov.

Frutex scandens, parasiticus; foliis oppositis, basi rotundatis; floribus racemosis; corolla rubra, labio antico valde brevior, lobis inaequalibus; calyce campanulato, 5-dentato.

KEY TO THE CHINESE SPECIES

- A. Flowers axillary, single, rarely 2 together, scattered throughout the whole length of the stems; calyx usually long-pilose within, sometimes tomentose; lower lip of corolla about as long as or slightly shorter than the upper lip, the lobes subequal and attached at about the same level; capsules densely tomentose to rarely glabrescent.
 - B. Calyx more or less prominently 5-costate, 5-dentate, usually long-pilose within; leaves strictly opposite, the base acute to cordate (SUBGENUS I. *Eubrandisia*).
 - C. Calyx broadly campanulate, about as long as broad, much enlarged above, the teeth divided for $\frac{1}{3}$ to $\frac{1}{2}$ the length.
 - D. Leaves subsessile to short-petiolate, the petiole to 4 or 5 mm. long; leaf-bases strongly cordate.....1. *B. Hancei*.
 - DD. Leaves distinctly and slenderly petiolate, the petioles 5 mm. or more long; leaf-bases acute to rounded or subcordate.
 - E. Petioles short, about 5 mm. long; calyx large, 10 mm. long, 8-9 mm. wide.
 - F. Leaves strongly discolored on the two surfaces, the upper dark brown to almost black in the dried state; leaf-bases rounded to subcordate.
 - G. Leaves broadly ovate, to 4 cm. wide and 9 cm. long; indumentum grayish; calyx-teeth long-acute, 7 mm. long.2. *B. Swinglei*.
 - GG. Leaves narrowly ovate, to 3 cm. wide and 9 cm. long; indumentum brownish; calyx-teeth short-acute, to 4 mm. long.....3. *B. laetevirens*.

- FF. Leaves subconcolorous on the two surfaces, the upper brownish in the dried state; leaf-bases acute to subrounded. . .4. *B. kwangsiensis*.
 EE. Petioles long, 1 cm. or more in length; calyx small, 6-7 mm. long and wide.5. *B. discolor*.
 CC. Calyx cylindric-campanulate, 1½ to 2 times as long as wide, narrowed or very slightly expanded above, the teeth divided to about a quarter of the length of the calyx.6. *B. glabrescens*.
 BB. Calyx without prominent nerves, 2-lobed, tomentose to glabrous within, the lobes entire or slightly bifid; leaves opposite to subopposite, the bases long-attenuate (SUBGENUS II. *Rhodobrandisia*).7. *B. rosea*.
 AA. Flowers racemose, many together on long or short branches or toward the end of the stems; calyx pubescent within; lower lip of corolla twice or more shorter than the upper lip, the middle lobe smaller than and attached half as low as the lateral ones in a deep notch; capsules glabrous (SUBGENUS III. *Coccineabotrys*).8. *B. racemosa*.

1. *Brandisia Hancei* Hook. f., Fl. Brit. Ind. 4: 257. 1884, *in nota*; Forbes & Hemsl. in Jour. Linn. Soc. Bot. 26: 179. 1890; Diels in Bot. Jahrb. 29: 565. 1900; Rehder in Sargent, Pl. Wils. 1: 573. 1913; Limpricht in Rep. Sp. Nov. Beih. 12: 480. 1922; Hu in Jour. Arnold Arb. 5: 233. 1924; Pai in Contr. Inst. Bot. Nat. Acad. Peiping 2: 186. 1934; Hand.-Maz., Symb. Sin. 7: 831. 1936.

Brandisia discolor sensu Hance in Jour. Bot. 18: 299. 1880, *non* Hook. f. & Thoms.

HUPEH: No precise localities, *Henry 1009* (NYBG), *3007* (USNH); western Hupeh, *Wilson 147* (NYBG, USNH), *147a* (NYBG); Ichang, *Wilson 2404* (AA, USNH); Liang Sung Kou, *W. Y. Chun 3840* (AA), *4185* (USNH); En-shih District, *H. C. Chow 1885* (AA, USNH); Yangtze Gorges, *N. C. Nelson s. n.* (UC). SZECHUAN: Tchen-keou-tin, *Farges s. n.* (ANSP, B); Mount Omei, *Chiao & Fan 362* (AA), *T. T. Yü 289* (AA); Nan-chuan District, *W. P. Fang 5675* (AA, ANSP, NYBG), *5676* (AA, ANSP, NYBG); Kwang-yun District, *F. T. Wang 22616* (AA); Wanhsien, Yen-ching-kou, *Mrs. W. Granger 3* (UC). YUNNAN: No precise localities, *E. E. Maire 1344* (UC), *Forrest 9370* (AA), *9672* (AA), *T. T. Yü 14812* (AA); Hee-chan-men, *Delavay 1934* (ANSP, B, NYBG); Mo-so-yn, *Delavay 4626* (ANSP, B); Kiao-kia, *F. Ducloux 1237* (UC); Yunnan sen, *F. Ducloux 159* (ANSP), *1027* (NYBG, UC); Siao-ou-long, *E. E. Maire 183* (AA); Pe-yen-tsin, *S. Ten 23* (AA), *34* (AA); Yungpe, *S. Ten 403* (UC); Mengtze, *A. Henry 9013* (AA, ANSP, MBG, NYBG, USNH); between Muang Hing and Szemao, *J. F. Rock 2821* (AA, UC, USNH); between Tengyueh and Likiang, *J. F. Rock 8115* (AA, UC, USNH); Kun-ming, *C. Schneider 55* (AA), *227* (AA), *H. Handel-Mazzetti 13053* (AA), *C. W. Wang 62624* (AA), *62050* (AA), *F. C. How 74244* (AA), *74247* (AA); Tsang-shan, near Tali, *C. Schneider 3246* (AA); Kien-shuei District, *H. T. Tsai 53027* (AA); Likiang, *C. W. Wang 71414* (AA), *K. M. Feng 2547* (AA), *2635* (AA), *R. C. Ching 20073* (AA), *21687* (AA); Hua-ning, *Y. Tsiang & H. Wang 16377* (AA); Monhua, *T. T. Yü 18269* (AA). KWEICHOW: Kiang-kou District, *Steward, Chiao, & Cheo 948* (AA, NYBG, USNH); Ying-kiang District, *Steward, Chiao, & Cheo 895* (USNH), *Y. Tsiang 7795* (NYBG); Chengfeng, *Y. Tsiang 4456* (AA, NYBG, USNH); Tungtze, *Y. Tsiang 4944* (NYBG), *5134* (NYBG, UC); An-lung, *Y. Tsiang 7416* (NYBG, UC), *9321* (NYBG); Chen-lin-shan, Kweiyang, *S. W. Teng 90019* (AA). KWANGSI: Ling-yun District, *Steward & Cheo 49* (AA).

This species was first identified as *Brandisia discolor* Hook f. & Thoms. by Hance. Hooker (l. c.), however, under that Burmese species simply mentioned: "The Chinese plant referred to *B. discolor* by Hance, differs in the broad calyx-lobes and corolla; it is *B. Hancei*, H. f." Hance's type is a Mesney collection from Kweiyang, Kweichow Province. Forbes and Hemsley cited *Henry s. n.* from Hupeh, *Mesney s. n.* from Kweichow, and also *Maire s. n.* and *Bourne s. n.* of unclarified locations. Rehder cited *Henry 1150* and *3007* from western Hupeh, and *Henry 9013* from Mengtze,

Yunnan. He said: "No good description of this species has been published so far, but according to Dr. A. B. Rendle of the British Museum who kindly compared Wilson's No. 3404 with the type of *B. Hancei* Hook. f. from Kweichou, there is no difference between the two specimens. Wilson's specimen also agrees perfectly with Henry's specimen from Hupeh referred by Hemsley to *B. Hancei*. Henry's No. 9013 from Yunnan differs slightly in its smaller and narrower leaves." Hu gave a detailed description for the species but cited no specimens.

Brandisia Hancei is apparently a common shrub at medium levels (500–2600 meters) in the mountains of western China. It is readily distinguished from related species by its smaller, very compactly arranged leaves, which are nearly sessile and strongly cordate at base. The leaves are densely stellate-ferruginous-tomentose on the lower surfaces and are not strongly discolored on the two surfaces as in some other species. The flowers (March–November) are red or yellow on the inside.

2. *Brandisia Swinglei* Merrill in Philip. Jour. Sci. Bot. 13: 157. 1918.

KWANGTUNG: Lofaushan, *E. D. Merrill 10851* (TYPE COLL., NYBG, UC); Lungmen District, Nan Kwan Shan, *W. T. Tsang 25401* (AA), *25438* (AA). KWANGSI: Waitsap District, Tong Shan, *W. T. Tsang 22862* (AA); Yao Shan, *C. Wang 39502* (AA), *40192* (AA).

Scattered shrubs, on mountain slopes at altitudes of about 500–1000 meters, in Kwangtung and adjacent parts of Kwangsi. Flowers pale yellow. Flowering from June to September.

The type of the species was from: "Kwangtung Province, Loh Fau Mountain (Lofaushan), *Merrill 10851*, August 22, 1917, in thickets along small streams, altitude about 950 meters; very rare, a single plant observed." Isotypes in the herbaria of the New York Botanical Garden and the University of California have been seen.

This species is characterized by its large broad leaves with grayish indumentum on the lower surface and the relatively longer and more acuminate calyx-teeth. It has the easternmost range of any species of the genus.

3. *Brandisia laetevirens* Rehder in Sargent, Pl. Wils. 1: 573. 1913.

YUNNAN: Szemao, *A. Henry 12605* (AA TYPE, MBG); Wen-shan District, *H. T. Tsai 51495* (AA); Shih-ping District, *H. T. Tsai 53434* (AA).

A shrub in forests on mountains at altitudes of 1300 to 1800 meters, in southern Yunnan. Flowers yellow. Flowering in January.

The type of the species was from "Yunnan: Szemao, eastern mountains, alt. 1300 m., *A. Henry* (No. 12605)." The holotype in the herbarium of the Arnold Arboretum has been seen.

This species is a close relative of *B. Hancei* and *B. discolor*. It is distinguished from the former by its large, less cordate, and more distinctly petiolate leaves. It differs from the latter notably in the larger calyx and shorter petioles. The corolla of *B. discolor* is also narrower and more densely tomentose and the leaves are darker on the upper surfaces, which become almost black in dried specimens.

4. *Brandisia kwangsiensis* sp. nov.

Frutex scandens, ramulis hornotinis fulvo-tomentosis; foliis chartaceis,

ovato-lanceolatis vel oblongis, longe acuminatis, basi acutis vel subrotundatis, 6–8 cm. longis, 2–3.7 cm. latis, margine integris, supra initio sparse stellato-tomentosis, mox glabrescentibus et glabris, in sicco luteo-viridibus, subtus dense flavescentibus stellato-tomentosis, reticulatis, nervis lateralibus utrinsecus 5–7, adscendentibus conjunctis, supra costa impressa subtus elevata; petiolis 4–8 mm. longis, fulvo-tomentosis; floribus axillaribus, solitariis, pedicellis gracilibus, fulvo-tomentosis, 8–9 mm. longis, medio bibracteolatis, bracteolis subulatis, caducis; calyce campanulato, 10-costato, circiter 1 cm. longo, extus dense tomentoso, intus dense piloso, lobis 5, late triangularibus, acutis, 2–3 mm. longis; corolla late campanulata, leviter curvata, bilabiata, circiter 2.4 cm. longa, rubra, extus dense stellato-tomentosa, limbo intus tomentoso, tubo intus glabro, labio postico magno truncato emarginato, lobo antico 3-lobato, fere dimidio brevior, lobis ovatis acutis; staminibus stylisque corolla subaequilongis; antheris dense pilosis; capsulis ovoideis, dense tomentosis, calyce incluso circiter 1 cm. longis.

KWANGSI: Ling-wun District, in dense woods, *S. K. Lau* 28688 (TYPE AA); Pin Lam, *S. P. Ko* 55685 (AA).

This species is strongly characterized by its relatively narrow leaves with acute to subrounded bases. From other related species, such as *B. Swinglei*, *B. laetevirens*, and *B. discolor*, this new species is also readily distinguished by the nearly concolorous leaves. The upper surfaces of the leaves are only slightly more brownish than the lower, while in the other species mentioned the upper surfaces are much darker and often turn blackish in the dried state. The reddish flowers appear in January.

Besides the two collections mentioned above, another specimen, *R. C. Ching* 6300 (NYBG), collected from Nee Bai, Kwangsi, may be referable to this species. On it the leaf-bases are more rounded. The specimen bears only incomplete fruits.

5. *Brandisia discolor* Hook. f. & Thoms. in Jour. Linn. Soc. Bot. 8: 11. t. 4. 1865; Kurz in Jour. As. Soc. Beng. 42: 236. 1873, For. Fl. Brit. Ind. 2: 250. 1877; Hook. f., Fl. Brit. Ind. 4: 257. 1865; Brandis, Ind. Trees 491. 1906; Rehder in Sargent, Pl. Wils. 1: 573. 1913.

YUNNAN: Szemao, *A. Henry* 12605B (AA, ANSP, MBG, NYBG), *J. F. Rock* 2769 (AA, USNH), *C. W. Wang* 80987 (AA, USNH).

A shrub on ridges in bushes at an altitude of about 1300 meters, from lower Burma to southern Yunnan. Flowers yellow. Flowering in March.

The type of the species is a collection made by Brandis in Martaban, Burma, although no collection is definitely cited with the original description.

This species was originally found in lower Burma and the southern Yunnan plants are apparently referable to it. The species is characterized by the slender distinct petioles, strongly darkened upper leaf-surfaces, and the relatively small calyces and narrow corollas.

6. *Brandisia glabrescens* Rehder in Sargent, Pl. Wils. 1: 574. 1913.

YUNNAN: Mengtze, *A. Henry* 9716 (AA, USNH), 9716A (AA TYPE); Ping-pien District, *H. T. Tsai* 62440 (AA), 62798 (AA).

A slender shrub, in forests at altitudes of about 2000–2300 meters, in southern Yunnan. Flowers yellow. Flowering in July and August.

Rehder cited two collections: "Yunnan: Mengtze, forest, alt. 2000 m., *A. Henry*

(No. 9176A); south of Red River from Manmei, alt. 2300 m., *A. Henry* (No. 9716)." Both are in the herbarium of the Arnold Arboretum, the first being designated by Rehder as the type. The number, however, should read 9716A.

This species is characterized by the long calyx. Besides this distinct calyx-character, it can also be readily distinguished from the related *B. discolor*, *B. Hancei*, etc., by the sparsely pubescent leaves, which are rounded to broadly truncate at the base.

7. *Brandisia rosea* W. W. Smith in Notes Bot. Gard. Edinb. 10: 10. 1918.

SIKANG: Tsarong, Salween-Chingkiang Divide, *G. Forrest* 20320 (AA, USNH). YUNNAN: Western flank of the Tali Range, *G. Forrest* 11565 (AA, RBGE TYPE, UC); Shang-pa District, *H. T. Tsai* 54774 (AA), 54859 (AA), 56644 (AA); Che-tse-lo, *H. T. Tsai* 54172 (AA), 58548 (AA); Chungtien, Wu-tso on the Yangtze bank, *K. M. Feng* 3344 (AA).

In woods or open thickets on mountain slopes at altitudes of 2100 to 3000 meters, in northwestern Yunnan and adjacent Sikang and also in eastern India. Flowers deep rose to reddish orange. Flowering from July to September.

The type of the species is from western Yunnan: "China, western flank of the Tali Range, Yunnan. Lat. 25° 40' N. Alt. 10,000 ft. Shrub of 3-5 ft. Flowers deep rose. Open dry situations amongst scrub. July 1913. G. Forrest. No. 11,565." The holotype in the Edinburgh Herbarium has been seen.

Brandisia rosea is distinctly characterized by the bilobed calyx. In this respect, it deviates from the original generic limits. It also differs from other species in its general appearance, especially in the relatively narrow long-attenuate leaves which are sometimes oppositely arranged. In view of these differences, it is here segregated as representing a different subgenus. The fruit and seed characters are the same as in the other species.

A variety with yellow flowers was described by Fischer, from Assam, India, as *Brandisia rosea* W. W. Smith var. *flava* C. E. C. Fischer, in Kew Bull. 1934: 93. 1934. In the Genera Plantarum, it is stated that, besides the original *B. discolor*, there is another species in India. Hooker, in the Flora of British India, said: "The supposed second species of *Brandisia*, alluded to in the 'Genera Plantarum' as a native of Bhotan, has stellate tomentum, lanceolate leaves and a 2-lipped calyx, and cannot be congeneric." Fischer identified this plant as belonging to *B. rosea*. He said: "Griffith's specimen [*Kew Dist.* 3748] from Bhutan, referred to in the Gen. Pl. and in the Fl. Brit. Ind., and a sheet collected by Nuttall also in Bhutan (both in the Kew Herb.) are this species, but being in fruit only it cannot be determined whether they represent the typical species or the colour variety."

8. *Brandisia racemosa* Hemsl. in Kew Bull. 1895: 114. 1895; Oliver in Hook. Ic. Pl. 24: t. 2383. 1895; Schneider, Ill. Handb. Laubholzk. 2: 618. fig. 399, c-h. 1911; Rehder in Sargent, Pl. Wils. 1: 574. 1913; Hand.-Mazz., Symb. Sin. 7: 831. 1936.

YUNNAN: Mengtze, *Hancock s. n.* (UC), *Henry* 9973 (AA, MBG, NYBG, USNH), *M. Leduc s. n.* (ANSP); Siao-ho, *E. E. Maire* 3986 (ANSP, B); Mongkou, *E. E. Maire* 10199 (NYBG, UC); Kiang-pien, *E. E. Maire s. n.* (ANSP); Kiao Kia, *F. Ducloux* 989 (NYBG, UC); near Kun-ming, *H. Handel-Mazzetti* 5051 (AA, USNH).

A spreading shrub, at altitudes of 800 to 2800 meters, in Yunnan. Flowers scarlet. Flowering in September.

Hemsley's type was from "Western China, in shady copses, Mongtze, Yunnan, *Hancock*, 143." It has not been seen. The description and original illustration by Oliver are distinctive. Two specimens collected by Hancock in the type locality in 1896 are in the herbarium of the University of California.

Brandisia racemosa is a most unique species of the genus, distinguished not only by the peculiar corolla-structure but also by the inflorescence. The flowers are arranged in short or long racemes. The calyx is shortly and inconspicuously 5-dentate. The corolla is strongly bilobed, the upper lip being much longer than the lower. The lower lip is 3-lobed, with the two lateral lobes adnate to the sides of the upper lip midway in the corolla and the middle lobe attached much lower in a deep notch between the two lateral lobes.

The plant also differs from other species of the genus in general appearance, with its long straggling branches and relatively smaller and more distinctly serrate leaves. The whole plant is blackened in the dried state, indicating its possible parasitic or semi-parasitic habit. Rehder mentioned that: "It was introduced by Mr. Wilson into cultivation, but it could not be grown successfully, as it is apparently parasitic and its proper host plant is not known."

Although the plant differs radically from other species of the genus in many respects, its basic characters in the stamens, fruits, and seeds agree with the genus in general. It is thought best to retain it in the genus but to designate a subgenus for its sole accommodation.

DOUBTFUL AND EXCLUDED SPECIES

Brandisia praticola W. W. Smith in Notes Bot. Gard. Edinb. 10: 10. 1918.

This species is based on *Forrest 13350* from northwestern Yunnan. The type, in the Edinburgh Herbarium, is available for study. It proves to be *Pterygiella nigrescens* Oliver.

Brandisia Souliei Bonati in Bull. Soc. Bot. France 56: 467. 1909.

This species is based on *Soulié 5199* from Yargong, Sikang Province. It has not been seen. According to the description, this species is distinguished by the 3-verticillate leaves, which are concolorous on the two surfaces, the flowers in axillary cymes, the membranaceous calyx with its 5 lobes subulate and splitting at the tips, etc. It does not represent the genus *Brandisia* but belongs in the Labiatae. A short discussion of this misplaced species will be issued in this Journal in the near future by Prof. E. D. Merrill.

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